

Section 6-4: Write and Graph Linear Inequalities

By the end of this lesson, you should be able to answer:

- How do you write linear inequalities in two variables?
- How do you graph linear inequalities in two variables on the coordinate plane?

Where you might see this in the real world:

- Business, market research, inventory

Define the following terms:

1. Open half-plane
2. Boundary
3. Linear inequality
4. Solution to the inequality
5. Graph of an inequality
6. Closed half-plane
7. Test point

When dealing with graphing linear inequalities, we need to use our knowledge of graphing linear equations. We need to start out by graphing our boundary line, keeping in mind whether to make it solid or dashed. After we graph the boundary line, we need to figure out which half-plane to shade in. We can do this by testing a point in each half plane.

Solid boundary line:

Dashed boundary line:

Example 1: Tell whether the given coordinates satisfy each inequality by testing each point. Is the boundary line solid or dashed?

a. $2x - 3y < 0$

(3, 5), (4, 0)

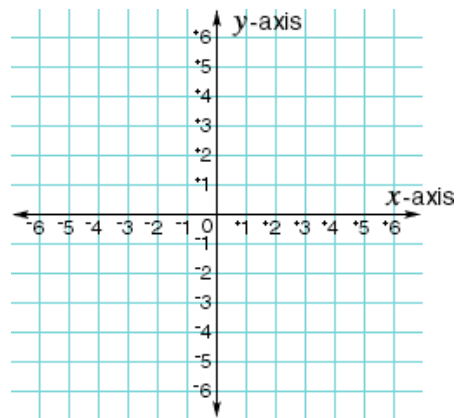
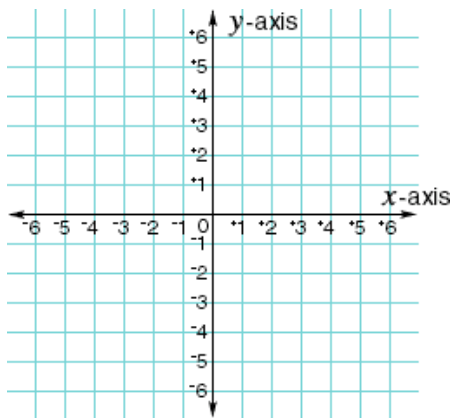
b. $4y - x \geq -6$

(-2, -6), (0, 0)

Example 2: Graph the following inequalities.

a. $y > 3x - 5$

b. $y \leq -\frac{3}{2}x + 4$



There is a pattern that shows up when the inequalities are written in the "slope-intercept" form. For $>$ and \geq , we shade above the boundary line. For $<$ and \leq , we shade below the boundary line.

THIS "TRICK" ONLY WORKS WHEN y COMES FIRST!!!

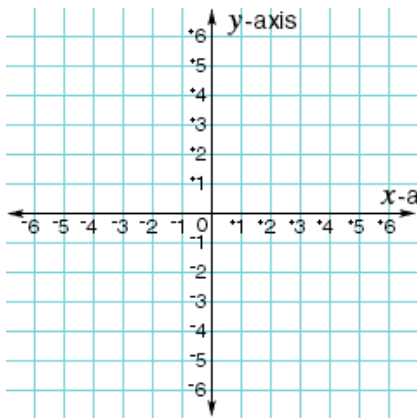
Shade above:

Shade below:

Example 3: Rectangle $ABCD$ has a perimeter of at least 10 cm.

a. Write a linear inequality that represents the situation.

b. Graph the solution of that inequality.



1. Graph the boundary line (solid or dashed?)

2. Test a point in each half-plane

c. Does the “trick” tells us to shade above or below the boundary line? How do you know?

d. Use the graph to name three possible combinations of length and width for rectangle $ABCD$. Check to make sure they satisfy the situation.

Homework:

"Everyone has talent. What is rare is the courage to follow the talent to the dark place where it leads." - Erica Jong